

## AMENDMENTS TO THE SPECIFICATION

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In the embodiment of FIG. 7, liquefied biomass feedstock 1 is pumped 70 into the base of shell and tube vertical heat exchange tower 71 where it passes through heat exchange sections 72, 73, 74, and 75 in which it is progressively heated until it is finally exited through line 5 at an elevated temperature of from 55 to 100 °C. Effluent in line 5 is directed into the vacuum dome 12 of one of several typical digester configurations 6 where it deposits its biomass solids to the digester 6. The bulk of effluent (nominally 95 to 99% water) either exits the dome directly in the form of water vapor or is added to the digester content as make up for digested sludge draw-off 7. Water vapor and ~~defused~~ diffused gases produced by digestion rise in vacuum line 37 and enter the second vertical heat exchange tower 76 where the vapor is cooled, condensed to water and progressively chilled in heat exchange sections 77 and 78. The condensing point in exchange tower 76 is maintained at approximately the distance of one atmosphere water column above dome 12 and the pipe velocities are maintained at above diffused gas bubbling point in order to keep the vacuum created by this arrangement from being broken.

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Control valve 89 cycles distilled water back to pre-chiller heat exchanger when higher volatile solids loadings produce more carbon dioxide than water from influent stream can dissolve. Carbon dioxide is removed for pH control and sale through 83. Methane is taken off at 55 to power the system, provide pH control in the digester and for sale or further utilization. Sodium sulfate precipitate is removed at 82 and sand/grit that may have entered the tower 71 is removed at 83. Pump ~~[[86]]~~ 84 circulates heat generated in vapor condenser 77 to heat exchanger 79 through heating loop 85. Refrigeration compressor ~~[[85]]~~ 86 removes heat from condensed vapor at evaporator 78 and supplies that heat to tower 71 at condenser exchanger 74 through refrigeration loop 87. Steam from boiler (FIG. 6) transmitted through loop 11 provides final heat to digester feedstock 1 at exchanger 75 of tower 71, and regulates the vaporization rate in dome 12 to meet digestion operational requirements.

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Water vapor and defused diffused gases produced by digestion rise in vacuum line 37 [[and]] are fed to the upper portion of a second vertical heat exchange tower 76 which is formed at the top of tower 71. There, the vapor is cooled, condensed to water and progressively chilled in different sections of the exchanger. The condensing point in exchange tower 76 is maintained at approximately the distance of one atmosphere water column above dome 12, and the pipe velocities are maintained above the diffused gas bubbling point in order to keep the vacuum created by this arrangement from being broken.